

STORMWATER MANAGEMENT REPORT

for

**240 COUNTY ROAD & 31 FELLOWS ROAD
IPSWICH, MASSACHUSETTS**

Prepared for:

New England Biolabs, Inc.
240 County Road
Ipswich, Massachusetts 01938

Prepared by:

Meridian Associates, Inc.
500 Cummings Center, Suite 5950
Beverly, Massachusetts 01915
(978) 299-0447
www.meridianassoc.com

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TABLE OF CONTENTS

- Stormwater Narrative
- Checklist for Stormwater Report
- Appendix
 - Construction Period Pollution Prevention Plan
 - Operation and Long Term Maintenance Program

STORMWATER NARRATIVE

Project Narrative:

The locus property is comprised of approximately 6.1± acres located at 31 Fellows Road in Ipswich, Massachusetts. This property is owned by New England Biolabs and is directly adjacent to the main campus at 240 County Road. The property is currently vacant land comprised of wooded and open field areas. The topography of the site includes hills and valleys with varying slopes ranging from 3% upwards of 20%. A bordering vegetated wetland is located centrally on the existing lot.

The applicant is proposing a new child care center which will include vegetated play areas, surface parking, and entry drive to the project connecting from the New England Biolabs campus driveway. The connector drive and surface parking area will form a loop allowing the center area to be utilized for bioretention.

This proposal utilizes low impact development strategies as well as conventional stormwater management techniques. Incorporated in this design is a bioretention (raingarden) area and infiltration basins for treatment and recharge of stormwater. Design strategies for the stormwater systems follow methods from the Massachusetts Stormwater Handbook.

The following are the DEP Stormwater Standards as outlined in the Wetlands Regulations:

Standard 1: No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

There are no new untreated stormwater discharges proposed with the completion of this project. Stormwater from impervious surfaces discharging to the bioretention area or infiltration basins will be pretreated utilizing a grass gravel combination or sediment forebay as appropriate as well as receive further treatment within the infiltration basin itself prior to discharge towards the existing wetland.

In addition, the proposed infiltration basin is designed with a riprap overflow weir which will act as a level spreader to dissipate velocity and spread any excess discharging flow. This mechanism will prevent point discharge and potential erosion to the existing wetland area.

Standard 2: Peak Rate Attenuation – Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

Reference is made to the report entitled “Stormwater Analysis and Calculations for 240 County Road & 31 Fellows Road” dated February 18, 2021.

The Stormwater Analysis utilizes the Soil Conservation Service Technical Report No. 55 and the Northeast Regional Climate Center to calculate peak runoff rates. Full detail of peak rate attenuation along with supplemental stormwater calculations utilizing HydroCAD as well as existing and post development watershed plans can be found in the referenced report.

The table below illustrates the predicted existing and post development stormwater flows for the 2, 10 and 100-year storm events.

Design Point #1

	<u>2-Year 24-Hour Storm Event</u>	<u>10-Year 24-Hour Storm Event</u>	<u>100-Year 24-Hour Storm Event</u>
Existing	0.0 CFS	0.4 CFS	3.7 CFS
Proposed	0.0 CFS	0.0 CFS	3.6 CFS

Design Point #2

	<u>2-Year 24-Hour Storm Event</u>	<u>10-Year 24-Hour Storm Event</u>	<u>100-Year 24-Hour Storm Event</u>
Existing	1.6 CFS	3.9 CFS	11.3 CFS
Proposed	1.3 CFS	3.0 CFS	11.3 CFS

The details of this report show that the peak rates of runoff for the 2, 10, and 100 year events have been either matched or reduced from pre to post conditions as required. We anticipate no adverse impacts or downstream flooding with the completion of this project.

Standard 3: Recharge - Loss of annual recharge to groundwater shall be eliminated or minimized...at a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This standard is met when the stormwater management system is designed to infiltrate the required recharge volume in accordance with the Massachusetts Stormwater Handbook.

Loss of annual recharge to groundwater has been minimized using stormwater Best Management Practices (BMP's), surface infiltration basins, a bioretention area, and a proposed operation and maintenance program. Based on maps by U.S. Department of Agriculture Soil Conservation Service the locus property consists of hydrologic soil groups A, B & D.

Utilizing the current regulations, the required recharge volume (Rv) is based on the following calculation:

- Rv = Fx
- Rv = Required Recharge Volume
- F = Target Depth Factor associated with hydrologic soil groups located in table 2.3.2 in Volume 3 of the Stormwater Management Handbook
- x = total onsite impervious area (within soil group designations)
- F = 0.6 inches (A-soil)
- F = 0.35 inches (B-soil)
- F = 0.1 inches (D-soil)
- X_A = 5,540 square feet (sf)
- X_B = 27,995 square feet (sf)
- X_D = 1,290 square feet (sf)

Rv (A soil) = 277 cf
 Rv (B soil) = 817 cf
 Rv (D soil) = 11 cf
 Rv (Total) = 1,105 cf
 Volume of storage provided under the outlet of the infiltration facilities for recharge:
 Basin #1 = 2,362 cf
 Basin #2 = 1,255 cf
 Bioretention = 843 cf
 Total Facilities = 4,460 cf > Rv (Total) = 1,105 cf

The Stormwater Handbook also requires recharge facilities be installed in soils capable of absorbing the recharge volume with the ability to drain within 72 hours. The formula for drawdown is as follows:

General Formula:

$$T_{DR} = \frac{\text{required storage volume}^*}{(\text{Rawls Rate})(\text{Bottom Surface Area of System})}$$

(*Required storage volume is equal to the larger of the calculated required recharge or treatment volumes. In this case, treatment volume is greater (see Standard 4).

Surface Basin #1:

Volume to Treat = 376 cf

$$T_{DR} = \frac{376cf}{\left(\frac{1.02in/hr}{12in/ft}\right)(2,085sf)} = 2.2 hrs$$

2.2hrs < 72hrs

Surface Basin #2:

Volume to Treat = 537cf

$$T_{DR} = \frac{537cf}{\left(\frac{8.27in/hr}{12in/ft}\right)(990sf)} = 0.8 hrs$$

0.8hrs < 72hrs

Bioretention Area:

Volume to Treat = 687cf

$$T_{DR} = \frac{687cf}{\left(\frac{2.41in/hr}{12in/ft}\right)(3,210sf)} = 1.1hrs$$

1.1hrs < 72hrs

A portion of the total onsite impervious area is not directed into one of the proposed infiltration facilities. In accordance with the Stormwater Handbook, a capture area adjustment calculation is required when runoff from only a portion of the impervious area on a site is directed to one or more infiltration BMPs. The following are steps of the capture area adjustment calculation to demonstrate the required minimum of 65% of the impervious area onsite is being directed to an infiltration BMP. The calculation also determines the increase in storage capacity of the infiltration BMPs to ensure they are able to capture sufficient runoff from the impervious surfaces within the contributing drainage area to infiltrate the required recharge volume.

1. Calculate Rv for the project:
From above Rv = 1,105 cf
2. Calculate the impervious area draining to recharge facilities:
Area = 31,940 sf
3. Divide site total site impervious by the impervious area draining to recharge facilities:
Total site impervious area = 34,825 sf
 $34,825\text{sf}/31,940\text{sf} = 1.1$
4. Multiply quotient from step 3 by the original Rv to determine the adjusted minimum storage volume needed to meet the recharge requirement:
 $1.1 \times 1,105 = 1,216$ cf
Infiltration facilities provide 4,460 cf of storage
5. Insure minimum of 65% of the site impervious area is being directed to the infiltration facilities:
 $31,940\text{sf}/34,825\text{sf} = 91\%$

In summary, the infiltration facilities onsite provide a total recharge storage volume which is greater than the adjusted minimum storage volume calculated by the capture area adjustment. The project also directs a minimum 65% of the impervious area into the recharge facilities which will provide sufficient runoff to infiltrate the required recharge volume. This ensures the post development annual recharge rate will approximate the annual rate from pre-development conditions.

Standard 4: Water Quality – Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). The standard is met with pollution prevention plans, stormwater BMP's sized to capture required water quality volume, and pretreatment measures.

As discussed above, there are no untreated stormwater discharges from the proposed project. The stormwater management system has been designed to remove a minimum of 80% of the average annual post-construction load of Total Suspended Solids (TSS) through the use of a bioretention area, surface infiltration facilities and a sediment forebay.

The Stormwater Management Handbook assigns TSS removal percentages to each treatment BMP. Each treatment BMP is sized to capture the required water quality volume calculated in

accordance with the Handbook in order to achieve the assigned TSS removal rates. The TSS removal rate for bioretention areas is 90% and surface infiltration facilities are 80%.

The following are water quality treatment sizing calculations:

General Equation from Stormwater Management Handbook

$$V_{wq} = (D_{wq})(A)$$

V_{wq} = required water quality volume

D_{wq} = water quality depth (1" for critical areas, 0.5" for non-critical areas)

A = impervious area

Area to Infiltration Basin #1:

$$D_{wq} = 0.5''$$

A = 9,020 sf (roof runoff only – considered “clean”)

$$V_{wq} = (0.5''/12) \times 9,020 \text{ sf}$$

$$V_{wq} = 376 \text{ cf}$$

Volume within infiltration basin = 2,362 cf

Area to Infiltration Basin #2:

$D_{wq} = 1''$ (due to “rapid infiltration rate”)

A = 6,440 sf

$$V_{wq} = (1''/12) \times 6,440 \text{ sf}$$

$$V_{wq} = 537 \text{ cf}$$

Volume within infiltration basin = 1,255 cf

Area to Bioretention Area:

$$D_{wq} = 0.5''$$

A = 16,480 sf

$$V_{wq} = (0.5''/12) \times 16,480 \text{ sf}$$

$$V_{wq} = 687 \text{ cf}$$

Volume within bioretention area = 843 cf

A separate document entitled “Operation and Long Term Maintenance Plan” dated February 18, 2021 is included in the appendix of this report. Suitable practices for source control and long term pollution prevention have been identified and shall be implemented as discussed.

The utilization of properly sized treatment BMP’s combined with the operation and maintenance plan provides compliance with this standard.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs) – Source control and pollution prevention shall be implemented in accordance with the Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

Stormwater Standard 5 is not applicable to this project. The proposed development will not subject the site to higher potential pollutant loads as defined in the Massachusetts Department of Environmental protection Wetlands and Water Quality Regulations.

LUHPPLs are identified in 310 CMR 22.20B(2) and C(2)(a)-(k) and (m) and CMR 22.21(2)(a)(1)-(8) and (b)(1)-(6), areas within a site that are the location of activities that are subject to an individual National Pollutant Discharge Elimination System (NPDES) permit or the NPDES Multi-sector General Permit; auto fueling facilities, exterior fleet storage areas, exterior vehicle service and equipment cleaning areas; marinas and boatyards; parking lots with high-intensity-use; confined disposal facilities and disposal sites.

Standard 6: Critical Areas – Stormwater discharges to critical areas require the use of specific source control and pollution prevention measures and specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas.

Standard 6 is not applicable to this project given that stormwater will not be discharged to a critical area. Critical areas are defined as Outstanding Resource Waters and Special Resource Waters as designated in 314 CMR 4.0, recharge areas for public water supplies as defined in 310 CMR 22.02 (including Zone II and Interim Wellhead Protection Areas), bathing beaches as defined in 105 CMR 445.000, cold-water fisheries and shellfish growing areas as defined in 314 CMR 9.02 and 310 CMR 10.04.

Standard 7: Redevelopments – A redevelopment project is required to meet Standards 1-6 only to the maximum extent practicable. Remaining standards shall be met as well as the project shall improve the existing conditions.

This project is not considered a redevelopment project and therefore this standard is not applicable.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan shall be implemented.

A Construction Period Pollution Prevention Plan for a Proposed Stormwater Management System report is included in the Appendix of this report. This program details the construction period operation and maintenance plan and sequencing for pollution prevention measures and erosion and sedimentation controls. Locations of erosion control measures for the project are depicted on the site plan set accompanying this report.

Standard 9: A long term Operation and Maintenance Plan shall be implemented.

An Operation and Long Term Maintenance Plan is included in the Appendix of this report. This long term operation and maintenance program provides details and the schedule for routine and non-routine maintenance tasks to be implemented at the completion of the project.

Standard 10: Prohibition of Illicit Discharges – Illicit discharges to the stormwater management system are prohibited.

Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Discharges to the stormwater management system from the following activities or facilities are permissible: Firefighting, water line flushing, landscape

irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents. All other illicit discharges are prohibited.

There are no known illicit discharges anticipated through the completion of this project. During construction and post construction procedures are provided to dissipate the potential for illicit discharges to the drainage system. Post construction preventions of illicit discharges are described in the Inspection and Maintenance Plan under the Good Housekeeping Practices section of the report.

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STORMWATER CHECKLIST



Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

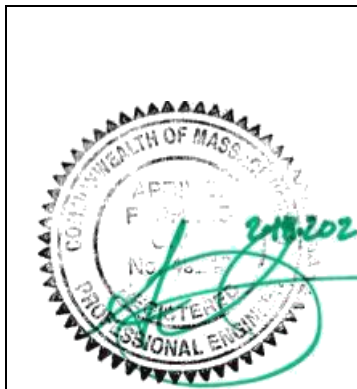
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- New development
- Redevelopment
- Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- No disturbance to any Wetland Resource Areas
- Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- Reduced Impervious Area (Redevelopment Only)
- Minimizing disturbance to existing trees and shrubs
- LID Site Design Credit Requested:
 - Credit 1
 - Credit 2
 - Credit 3
- Use of “country drainage” versus curb and gutter conveyance and pipe
- Bioretention Cells (includes Rain Gardens)
- Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- Treebox Filter
- Water Quality Swale
- Grass Channel
- Green Roof
- Other (describe): _____

Standard 1: No New Untreated Discharges

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - Static
 - Simple Dynamic
 - Dynamic Field¹
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - Site is comprised solely of C and D soils and/or bedrock at the land surface
 - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - Solid Waste Landfill pursuant to 310 CMR 19.000
 - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - is within the Zone II or Interim Wellhead Protection Area
 - is near or to other critical areas
 - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - involves runoff from land uses with higher potential pollutant loads.
 - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
 - ** The ½" or 1" Water Quality Volume or
 - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does **not** cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.

** The calculations utilize the half-inch rule for BMP's (as noted in the treatment calculations provided).



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - Limited Project
 - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - Bike Path and/or Foot Path
 - Redevelopment Project
 - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- The project is **not** covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - Name of the stormwater management system owners;
 - Party responsible for operation and maintenance;
 - Schedule for implementation of routine and non-routine maintenance tasks;
 - Plan showing the location of all stormwater BMPs maintenance access areas;
 - Description and delineation of public safety features;
 - Estimated operation and maintenance budget; and
 - Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

APPENDIX

**CONSTRUCTION PERIOD POLLUTION
PREVENTION PLAN FOR A
PROPOSED STORMWATER MANAGEMENT SYSTEM**

located at

**240 COUNTY ROAD & 31 FELLOWS ROAD
IPSWICH, MASSACHUSETTS**



Applicant:

New England Biolabs, Inc
240 County Road
Ipswich, Massachusetts 01938

Prepared by:

Meridian Associates, Inc.
500 Cummings Center, Suite 5950
Beverly, Massachusetts 01915
(978) 299-0447

February 18, 2021

Project Name: Childcare Center at NEB
Ipswich, Massachusetts

Owner Name: New England Biolabs, Inc.
240 County Road
Ipswich, Massachusetts 01938

Party Responsible for Maintenance: New England Biolabs, Inc.
Pat Norton, AD Facilities & Engineering

Project Description:

The locus is comprised of approximately 6.1± acres located at 31 Fellows Road in Ipswich, Massachusetts. This property is owned by New England Biolabs and is directly adjacent to the main campus at 240 County Road. The property is currently vacant land comprised of wooded and open field areas. The topography of the site includes hills and valleys with varying slopes ranging from 3% upwards of 20%. A bordering vegetated wetland is located centrally on the existing lot.

The applicant is proposing a new child care center which will include vegetated play areas, surface parking, and entry drive to the project connecting from the New England Biolabs campus driveway. The connector drive and surface parking area will form a loop allowing the center area to be utilized for bioretention.

Erosion and Sedimentation Control Measures During Construction Activities

Erosion Control Sock

Erosion Control Socks are proposed to be installed, as shown on the site plan, around the perimeter of the redevelopment. The barriers are burlap fabric mitts filled with compost blends and shall be installed prior to the commencement of any work on-site and in accordance with the design plans. An additional supply of socks shall be on-site to replace and/or repair socks that have been disturbed. The lines of socks shall be inspected and maintained on a weekly basis during construction. Deposited sediments shall be removed when the level of deposition reaches approximately one-half the height of the Erosion Control Sock.

Storm Drain Inlet Protection

A temporary storm inlet protection filter will be placed around all catchbasin units. The purpose of the filter is to prevent the inflow of sediments into the closed drainage system. The filter shall remain in place until a permanent vegetative cover is established and the transport of sediment is no longer visibly apparent. The filter shall be inspected and maintained on a weekly basis and after every storm of 0.25 inches or more of rainfall/precipitation.

Surface Stabilization

The surface of all disturbed areas shall be stabilized during and after construction as soon as practical but no more than fourteen (14) days after construction activity has temporarily or permanently ceased on that portion of the site. Temporary measures shall be taken during construction to prevent erosion and siltation. No construction sediment shall be allowed to enter any infiltration systems or the raingarden. All disturbed slopes will be stabilized with a permanent vegetative cover. Stabilization netting or tackifier applied with hydroseeding shall be used on all slopes 3:1 or greater. Some or all of the following measures will be utilized on this project as conditions may warrant.

- a. Temporary Seeding
- b. Temporary Mulching
- c. Permanent Seeding
- d. Placement of Sod
- e. Hydroseeding
- f. Placement of Hay
- g. Placement of Jute Netting

Street Sweeping

Any sediment tracked onto public right-of-ways or parking areas shall be swept at the end of each working day.

Surface Infiltration Basin

The Surface Infiltration Basin shall be checked weekly and after major storm events during construction for rilling, erosion, and debris removal. Avoid compaction of the parent material by working from the edge of the area proposed as the location of the Surface Infiltration Basin.

Sediment Forebay

Sediment forebay to be checked weekly and after major storm events for erosion, rilling, trash, and debris removal. After construction of the basins, stabilize the floor and side slopes of the basins with a dense turf of water tolerant grass. Use low maintenance, rapidly germinating grasses such as fescues (see landscape plan for planting specification). No runoff shall be directed to the basins until the bottom and side slopes are fully stabilized.

Raingardens

Raingardens shall be checked weekly and after major storm events during construction for rilling, erosion, and debris removal. Avoid compaction of the parent material by working from the edge of the area proposed as the location of the raingarden. No construction period runoff should be directed into the raingardens.

Interim Erosion Control

Additional erosion control measures shall be implemented as conditions warrant during construction or as directed by the owner or owner's representative.

Construction Entrance

Install the construction entrance as detailed on the site plans. The entrance should be maintained in a condition that will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic topdressing with additional stone. Inspect entrance/exit pad and sediment disposal area weekly and after heavy rains or heavy use. Remove mud and sediment tracked or washed onto public roads immediately. Mud and soil particles will eventually clog the voids in the gravel and the effectiveness of the gravel pad will not be satisfactory. When this occurs, the pad should be top dressed with new stone. Complete replacement of the pad may be necessary when the pad becomes completely clogged. Reshape pad as needed for drainage and runoff control. Repair any broken road pavement immediately.

Topsoil Stockpile

Locate the topsoil stockpile so it does not interfere with work on the site maintaining a 50' buffer from wetland areas. Side slopes of the stockpile should not exceed 2:1. Surround all stockpiles with silt fence or erosion control socks. Either seed or cover stockpiles with clear plastic or other mulching materials within 7 days of the formation of the stockpile.

Outlet Protection

Inspect rip rap outlet structures after heavy rains for erosion at sides and ends of apron and for stone displacement. Rock may need to be added if sediment builds up in the pore spaces of the outlet pad. Make repairs immediately using appropriate stone sizes. Do not place stones above finished grade.

Removal

All facilities used as temporary measures shall be cleaned prior to being put into final operation. When construction is complete, the contractor shall remove all siltation devices after re-vegetation of disturbed areas and after written approval from the project engineer.

Provisions for storing paints, cleaners, automotive waste and other potentially hazardous household waste products inside or under cover

- All materials on site will be stored inside in a neat, orderly, manner in their appropriate containers with the original manufacturer's label. Appropriate cover of materials shall be provided to prevent these chemicals from contact with rainwater.
- Only store enough material necessary. Whenever possible, all of a product shall be used up before disposing of container.
- Manufacturer, local, and State recommendations for proper use and disposal shall be followed.

Construction Vehicles & Equipment

- At the end of each work day, all construction vehicles shall be parked outside the 100' buffer to the bordering vegetated wetlands.
- All fueling and maintenance of vehicles and equipment shall be performed outside resource buffer zones. Storage, handling and disposal of fuels and liquids in relation to construction vehicles and equipment shall be conducted in compliance with National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges from Construction Activities (CGP) 2017 Section 2.3.

Spill prevention and response plans

- Spill Control Practices shall be in conformance with the guidelines set forth in the National Pollutant Discharge Elimination System (NPDES) CGP 2017.
- Clean up spills immediately, using dry cleanup methods where possible and dispose of used materials properly. Do not clean surfaces or spills by hosing the area down. Eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.
- Spill kits shall be readily available onsite during construction.

Provisions for maintenance of lawns, gardens, and other landscaped areas

- Grass shall not be cut shorter than 2 to 3 inches and mulch clipping should be left on lawn as a natural fertilizer.
- Refer to landscape plans for maintenance of planted areas.
- Use low volume water approaches such as drip-type or sprinkler systems. Water plants only when needed to enhance root growth and avoid runoff problems.
- The use of mulch shall be utilized where possible. Mulch helps retain water and prevents erosion.

Requirements for storage and use of fertilizers, herbicides and pesticides

- Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.
- Do not fertilize before a rainstorm.
- Consider using organic fertilizers. They release nutrients more slowly.
- Pesticides shall be applied on lawns and gardens only when necessary and applied only in the minimum amounts recommended by the manufacturer.

Provisions for solid waste management

- All solid waste shall be disposed of or recycled in accordance with local town regulations.

Snow disposal and plowing

- Snow shall be plowed and stored on gravel, grass, or other permeable surfaces to allow filtration to occur.
- Once snow melts all sand, salt and debris shall be extracted from surface and properly disposed of.
- Snow shall not be disposed of in any wetland resource area or waterbody.
- Avoid disposing snow on top of storm drain catchbasins or stormwater drainage swale.

Winter Road Salt and/or Sand use and storage restrictions

- Salt storage piles should be located outside the 100-year buffer zone and shall be covered at all times.
- The amount of road salt applied should be regulated to prevent over salting of roadways and increasing runoff concentrations. Alternative materials, such as sand or gravel, should be used in especially sensitive areas.

Roadway and Parking Lot sweeping schedule

- Pavement sweeping shall be conducted at a frequency of not less than once per year.
- Removal of any accumulated sand, grit, and debris from driveway after the snow melts shall be completed shortly after snow melts for the season.

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STORMWATER MANAGEMENT
CONSTRUCTION PHASE

INSPECTION SCHEDULE AND EVALUATION CHECKLIST

PROJECT LOCATION: Childcare Center at NEB, Ipswich, Massachusetts

Major Event = Rainstorm of 1/4-inch or more

Inspection Date	Inspector	Area Inspected	Best Management Practice (yes/no)	Required Inspection Frequency if BMP	Comments	Recommendation	Follow-up Inspection Required (yes/no)
		Erosion Control Sock	No	Weekly and After Major Storm Events			
		Storm Drain Inlet Protection	Yes	Weekly and After Major Storm Events			
		Surface Infiltration Basin	Yes	Weekly and After Major Storm Events			
		Construction Entrance	No	Weekly and After Major Storm Events			
		Raingarden	Yes	Weekly and After Major Storm Events			
		Soil Stockpile Area	No	Weekly and After Major Storm Events			
		Outlet Protection	Yes	Weekly and After Major Storm Events			

(1) Refer to the Massachusetts Stormwater Handbook, Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspection and maintenance of specific BMP's.

(2) Inspections to be conducted by a qualified professional knowledgeable in the principles & practice of erosion and sediment controls and pollution prevention.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.

Other notes: (Include deviations from: Con. Comm. Order of Conditions, PB Approval, Construction Sequence and Approved Plan)

Stormwater Control Manager: _____

**OPERATION AND
LONG TERM MAINTENANCE PLAN**

located at

**240 COUNTY ROAD & 31 FELLOWS ROAD
IPSWICH, MASSACHUSETTS**



Applicant:

New England Biolabs, Inc
240 County Road
Ipswich, Massachusetts 01938

Prepared by:

Meridian Associates, Inc.
500 Cummings Center, Suite 5950
Beverly, Massachusetts 01915
(978) 299-0447

February 18, 2021

Project Name: Childcare Center at NEB
Ipswich, Massachusetts

Owner Name: New England Biolabs, Inc.
240 County Road
Ipswich, Massachusetts 01938

Party Responsible for Maintenance: New England Biolabs, Inc.
Pat Norton, AD Facilities & Engineering

Project Description:

The locus is comprised of approximately 6.1± acres located at 31 Fellows Road in Ipswich, Massachusetts. This property is owned by New England Biolabs and is directly adjacent to the main campus at 240 County Road. The property is currently vacant land comprised of wooded and open field areas. The topography of the site includes hills and valleys with varying slopes ranging from 3% upwards of 20%. A bordering vegetated wetland is located centrally on the existing lot.

The applicant is proposing a new child care center which will include vegetated play areas, surface parking, and entry drive to the project connecting from the New England Biolabs campus driveway. The connector drive and surface parking area will form a loop allowing the center area to be utilized for bioretention.

Inspection and Maintenance Measures After Construction

Erosion Control

Eroded sediments can adversely affect the performance of the stormwater management system. Eroding or barren areas should be immediately re-vegetated.

Bioretention Areas

Bioretention areas shall be inspected on a semi-annual basis (fall and spring) for removal of dead vegetation and any required pruning. Replacement of dead vegetation as well as re-mulching shall occur in the spring. Replace mulch once every two years in the early spring. Inspect and remove any trash and debris monthly as well as repairing any eroded areas. Remove invasive species as needed to prevent species from spreading into the raingarden. Should the raingarden fail, excavate entire bioretention area, scarify the bottom and sides, replace stone and soil media, replant and mulch.

Infiltration Basin

Once the basin is in use, inspect after every major storm (a storm that is equal or greater than the 2 year 24 hour storm of 3.1") for the first few months to ensure it is stabilized and functioning properly. Subsequently, inspect the infiltration basin at least twice per year. Important items to

check during the inspection include cracking, erosion, leakage in the embankments, tree growth on the embankments, condition of riprap, sediment accumulation and the health of all turf.

Twice a year mow the side slopes and basin bottom. Remove grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. For the remainder of the year, the side slopes can be left to grow and naturalize. Remove trash and debris at the same time. Use deep tilling to break up clogged surfaces and revegetate immediately.

Remove sediment from the basin as necessary but wait until the floor of the basin is thoroughly dry. Use light equipment to remove the top layer to not compact the underlying soil. Deeply till the remaining soil and revegetate as soon as possible.

The vegetated areas immediately at the discharge point and down-slope of the rip-rap shall be inspected after major storm events, or at minimum twice per year. These locations will be subject to concentrated flows and therefore may be prone to erosion and the formation of gullies or channels. If any gullies or channels are observed, they should immediately be repaired by installing sod and reseeding with grass. These areas shall be reseeded until a stable groundcover is established.

Sediment Forebay

Maintenance of the sediment forebay is important to prevent resuspension of accumulated sediments. Inspect and clean the sediment forebay two times a year to remove accumulated sediment. During inspection, check for rilling or gullying and repair as needed. Remove any trash or debris. After removing sediment, replace any vegetation damaged during the clean out by either reseeding or resodding. When reseeding, incorporate practices such as hydroseeding with tackifier or blanket to ensure no scour occurs while seeds develop roots. Keep grass mowed no lower than 3-4 inches.

Debris and Litter Removal

Trash may collect in the BMP's, potentially causing clogging of the facilities. All debris and litter shall be removed when necessary, and after each storm event.

Outlet Protection

Inspect rip rap outlet structures after heavy rains for erosion at sides and ends of apron and for stone displacement. Rock may need to be added if sediment builds up in the pore spaces of the outlet pad. Make repairs immediately using appropriate stone sizes. Do not place stones above finished grade.

Stone & Turf Filter Strip

Conduct semi-annual inspections the first year (and annually thereafter) of the Stone & Turf Filter Strip. Inspect stone for sediment buildup and vegetation for signs of erosion, bare spots and overall health. Mow as necessary to ensure grass height does not exceed 6". Keep turf height between 3"-4" to ensure effectiveness of vegetation in reducing flow velocity and pollutant removal. Re-seed periodically to maintain dense turf. If stone is clogged or covered in sediment, remove sediment and clogged stone and replace with clean washed stone. Remove sediment that accumulates near the

top of the strip to maintain appropriate slope and prevent formation of a berm which could impede distribution of runoff as sheet flow.

Good Housekeeping Practices (in accordance with Standard 10 of the Stormwater Management Handbook to prevent illicit discharges)

Provisions for storing paints, cleaners, automotive waste and other potentially hazardous household waste products inside or under cover

- All materials on site will be stored inside in a neat, orderly, manner in their appropriate containers with the original manufacturer's label.
- Only store enough material necessary. Whenever possible, all of a product shall be used up before disposing of container
- Manufacturer, local, and State recommendations for proper use and disposal shall be followed.

Vehicle washing controls

- A commercial car wash shall be used when possible. Car washes treat and/or recycle water.
- Cars shall be washed on gravel, grass, or other permeable surfaces to allow filtration to occur.
- Use biodegradable soaps.
- A water hose with a nozzle that automatically turns off when left unattended.

Requirements for routine inspection and maintenance of stormwater BMPs

- See Inspection and Maintenance Measures after Construction.

Spill prevention and response plans

- Spill Control Practices shall be in conformance with the guidelines set forth in the National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan (SWPPP)

Provisions for maintenance of lawns, gardens, and other landscaped areas

- Grass shall not be cut shorter than 2 to 3 inches and mulch clipping should be left on lawn as a natural fertilizer.
- Use low volume water approaches such as drip-type or sprinkler systems. Water plants only when needed to enhance root growth and avoid runoff problems.
- The use of mulch shall be utilized where possible. Mulch helps retain water and prevents erosion.

Requirements for storage and use of fertilizers, herbicides and pesticides

- Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.
- Do not fertilize before a rainstorm.
- Consider using organic fertilizers. They release nutrients more slowly.
- Pesticides shall be applied on lawns and gardens only when necessary and applied only in the minimum amounts recommended by the manufacturer.

Pet waste management

- Scoop up and seal pet wastes in a plastic bag. Dispose of properly, in the garbage.

Provisions for operation and management of septic systems

- Follow town Board of Health requirements as well as requirements of the State Environmental Code Title 5.

Provisions for solid waste management

- All solid waste shall be disposed of or recycled in accordance with local town regulations.

Snow disposal and plowing plans relative to Wetland Resource Area

- Snow shall be plowed and stored on gravel, grass, or other permeable surfaces to allow filtration to occur.
- Snow shall not be disposed of in any wetland resource area or waterbody.
- Avoid disposing snow on top of storm drain catchbasins or stormwater drainage swale.

Winter De-Icing and/or Sand use and storage restrictions

- Salt storage piles should be located outside the 100-year buffer zone and shall be covered at all times.
- The amount of road salt applied should be regulated to prevent over salting of roadways and increasing runoff concentrations. Alternative materials, such as sand or gravel, should be used in especially sensitive areas.

Roadway and Parking Lot sweeping schedule

- Pavement sweeping shall be conducted at a frequency of not less than once per year
- Removal of any accumulated sand, grit, and debris from driveway winter maintenance shall be completed in the spring, shortly after snow melts for the season.

Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL

- Not Applicable

Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan

- To be determined by the owner.

List of Emergency contacts for implementing Long-Term Pollution Prevention Plan

- To be determined by the owner.

STORMWATER MANAGEMENT
POST-CONSTRUCTION PHASE

INSPECTION SCHEDULE AND EVALUATION CHECKLIST

PROJECT LOCATION: Childcare Center at NEB

Inspection Date	Inspector	Area Inspected	Best Management Practice (yes/no)	Required Inspection Frequency if BMP	Recommendation	Follow-up Inspection Required (yes/no)
		Infiltration Basin	Yes	Twice a year		
		Bioretention Area	Yes	Monthly (Trash removal) 4 Times per year (Mow) Once a year (General Maintenance)		
		Sediment Forebay	Yes	First months after construction then Twice a year with infiltration basin		
		Outlet Protection	Yes	Twice a year with infiltration basin		

Comments: _____

- (1) Refer to the Massachusetts Stormwater Handbook, Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspection and maintenance of specific BMP's.
- (2) Inspections to be conducted by a qualified professional knowledgeable in the principles & practice of erosion and sediment controls and pollution prevention.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.

Other notes: (Include deviations from: Con. Comm. Order of Conditions, PB Approval, Construction Sequence and Approved Plan)

Stormwater Control Manager: _____